CLAIMS

What is claimed is:

1. A pressure differential-driven engine, comprising:

an outer pressurizable enclosure;

a pressure barrier plate disposed within the outer pressurizable enclosure;

an actuator enclosure, disposed adjacent the pressure barrier plate and having an actuator disposed therein;

the actuator having a high pressure exposure surface forming an oblique angle with respect to the pressure barrier plate;

the pressure barrier plate, a bottom of the actuator, and the actuator enclosure cooperatively defining a pressurizable cavity cyclable between a first, high pressure state, and a second, low pressure state; and

the actuator and actuator enclosure being collectively slidable relative to the barrier plate, and the engine being configured so as to operate in reaction to cycling of the pressurizable cavity between the first and second pressure states to produce usable translational energy.

2. The engine of claim 1, further comprising at least one support rail fixed in position relative to the pressure barrier plate, and wherein the actuator is rigidly and slidably coupled to the support rail in a substantially constant position with respect to the actuator enclosure, the support rail being configured to translate force applied by the actuator into translational energy.

3. The engine of claim 2, wherein the at least one support rail is fixed in position substantially parallel to the pressure barrier plate.

4. The engine of claim 1, wherein the pressure barrier plate is aligned at an oblique angle with respect to a lower surface of the outer enclosure, and wherein the high pressure exposure surface of the actuator is oriented substantially parallel to the lower surface of the outer enclosure.

5. The engine of claim 1, wherein the pressure barrier plate is aligned substantially parallel to a lower surface of the outer enclosure, and wherein the high pressure exposure

surface of the actuator is oriented at an oblique angle with respect to the lower surface of the outer enclosure.

6. The engine of claim 1, further comprising a second actuator enclosure disposed adjacent the pressure barrier plate having a second actuator disposed therein, the second actuator enclosure and second actuator having a direction of positive drive opposing a direction of positive drive of the actuator enclosure and actuator.

7. The engine of claim 1, further comprising a power take-off device operatively coupled to the actuator to convert cyclic linear motion of the actuator into useable mechanical energy.

8. The engine of claim 7, wherein the power take-off device includes a lower, collapsible piston assembly configured to convert the cyclic motion of the actuator and actuator assembly into lateral, linear cyclic motion.

9. The engine of claim 1, further comprising at least one substantially pressure-tight seal disposed between the actuator enclosure and the barrier plate to facilitate slidable movement of the actuator enclosure along the barrier plate while maintaining integrity of the pressurizable cavity.

10. The engine of claim 1, further comprising a valve system operatively coupled to the actuator, the valve system enabling cycling of the pressurizable cavity between the first and second pressure states.

11. The engine of claim 10, wherein the valve system selectively exposes the pressurizable cavity to an ambient pressure state external to the outer enclosure, said ambient pressure state corresponding to the second, low pressure state.

12. A pressure differential-driven engine, comprising:

an outer pressurizable enclosure;

a pressure barrier plate being disposed within the outer pressurizable enclosure;

an actuator enclosure, disposed upon the pressure barrier plate and having an actuator disposed therein, said actuator being rigidly and slidably coupled to at least one support rail fixed in position with respect to the actuator enclosure;

the pressure barrier plate, a bottom of the actuator, and the actuator enclosure cooperatively defining a pressurizable cavity cyclable between a first, high pressure state, and a second, low pressure state; and

the actuator and actuator enclosure being slidable relative to the barrier plate in reaction to cycling of the pressurizable cavity between the first and second pressure states to produce usable translational energy.

13. The engine of claim 12, wherein the at least one support rail is fixed in position substantially parallel to the pressure barrier plate.

14. The engine of claim 12, wherein the pressure barrier plate is oriented at an oblique angle with respect to a lower surface of the outer enclosure, and wherein a high pressure exposure surface of the actuator is oriented substantially parallel to the lower surface of the outer enclosure.

15. The engine of claim 12, wherein the pressure barrier plate is oriented substantially parallel to a lower surface of the outer enclosure, and wherein a high pressure exposure surface of the actuator is oriented at an oblique angle with respect to the lower surface of the outer enclosure.

16. The engine of claim 12, further comprising a second actuator enclosure disposed adjacent the barrier plate and having a second actuator disposed therein, the second actuator enclosure and second actuator having a direction of positive drive opposing a direction of positive drive of the actuator enclosure and actuator.

17. The engine of claim 12, further comprising a power take-off device operatively coupled to the actuator to convert cyclic linear motion of the actuator into useable mechanical energy.

18. The engine of claim 17, wherein the power take-off device includes a lower, collapsible piston assembly configured to convert the cyclic motion of the actuator and actuator assembly into lateral, linear cyclic motion.

19. The engine of claim 12, further comprising at least one substantially pressure-tight seal disposed between the actuator enclosure and the barrier plate to facilitate slidable movement of the actuator enclosure along the barrier plate while maintaining integrity of the pressurizable cavity.

20. The engine of claim 12, further comprising a valve system operatively coupled to the actuator, the valve system enabling cycling of the pressurizable cavity between the first and second pressure states.

21. The engine of claim 20, wherein the valve system selectively exposes the pressurizable cavity to an ambient pressure state external to the outer enclosure, said ambient pressure state corresponding to the second, low pressure state.

22. A method for converting energy from a high pressure fluid into usable translational energy, comprising the steps of:

disposing an actuator enclosure adjacent a pressure barrier plate within an outer, high pressure enclosure, said actuator enclosure being slidable relative to the barrier plate within the outer, high pressure enclosure;

disposing an actuator within the actuator enclosure, with a high pressure exposure surface of the actuator disposed at an oblique angle to the pressure barrier plate;

retaining the actuator from moving with respect to the actuator enclosure;

pressurizing the outer, high pressure enclosure to a high pressure state; and

creating a low pressure state between the actuator and the actuator enclosure to thereby cause the actuator and actuator enclosure to slide relative to the barrier plate within the outer, high pressure enclosure.

23. The method of claim 22, comprising the further step of rigidly and slidably coupling the actuator to a support rail fixed in a substantially constant position with

respect to the barrier plate to translate force applied by the actuator into translational energy.

24. The method of claim 23, comprising the further step of aligning the support rail substantially parallel to the pressure barrier plate.

25. The method of claim 22, comprising the further steps of:

aligning the pressure barrier plate at an oblique angle with respect to a lower surface of the outer enclosure, and

orienting the high pressure exposure surface of the actuator substantially parallel to the lower surface of the outer enclosure.

26. The method of claim 22, comprising the further steps of:

aligning the pressure barrier plate substantially parallel to a lower surface of the outer enclosure, and

orienting the high pressure exposure surface of the actuator at an oblique angle with respect to the lower surface of the outer enclosure.

27. The method of claim 22, comprising the further step of disposing a second actuator enclosure adjacent the pressure barrier plate, the second actuator enclosure having a second actuator disposed therein, the second actuator enclosure and second actuator having a direction of positive drive opposing a direction of positive drive of the actuator enclosure and actuator.

28. The method of claim 22, comprising the further step of operatively coupling a power take-off device to the actuator to convert cyclic linear motion of the actuator into useable mechanical energy.

29. The method of claim 28, wherein the power take-off device includes a lower, collapsible piston assembly configured to convert the cyclic motion of the actuator and actuator assembly into lateral, linear cyclic motion.

30. The method of claim 22, comprising the further step of disposing at least one substantially pressure-tight seal between the actuator enclosure and the barrier plate to facilitate slidable movement of the actuator enclosure along the barrier plate while maintaining integrity of the pressurizable cavity.

31. The method of claim 22, comprising the further step of operatively coupling a valve system to the actuator, the valve system enabling cycling of the pressurizable cavity between the first and second pressure states.

32. The method of claim 31, wherein the valve system selectively exposes the pressurizable cavity to an ambient pressure state external to the outer enclosure, said ambient pressure state corresponding to the low pressure state.